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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,353	11/17/2003	Sung-mun Cho	45686	9153

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EXAMINER

TSO, EDWARD H

ART UNIT	PAPER NUMBER
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2838

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/713,353

Applicant(s)

CHO

Examiner

Edward H. Tso

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/11/2006</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6-10, and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuda et al. (US 5,739,667).

As to Claim 1, Matsuda discloses a digital device capable of recharging a rechargeable battery comprising; a consuming current detect unit for detecting a consuming current input to the digital device (Figure 1, element 11); a control unit for generating a control signal based on the consuming current and a battery recharging current (element 16); a recharging current detect unit for detecting the battery recharging current as the battery is recharged (element 10); and a recharging control unit for regulating the consuming current to the rechargeable battery in proportion to the control signal output from the control unit and the battery recharging current detected by the recharging current detect control unit (element 4, 16, and 56).

As to Claim 2, which is dependent upon claim 1, Matsuda discloses wherein the control signal includes a pulse width modulation signal (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 3, which is dependent upon claim 2, Matsuda discloses wherein the pulse width modulation control signal has a duty ratio adjusted according to the consuming current detected by the consuming current detect unit (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 4, which is dependent upon claim 1, Matsuda discloses wherein the consuming current detect unit comprises (element 11): a first current detecting resistor for detecting the consuming current (Figure 4, element R6) ; and a first operational amplifier, wherein a first end of the first current detecting resistor is coupled to an inverting input of the first operational amplifier and the second end of the first current detecting resistor is coupled to the non-inverting input of the first operational amplifier (Figure 4, element ERR2- and EER 2+).

As to Claim 6, which is dependent upon claim 1, Matsuda further discloses wherein the recharging control unit comprises: an integrator (element 31), an input of which is coupled to a first output of the control unit (Figure 4, element 56); a third operational amplifier (element 32); a fourth current detecting resistor (Inside element 54); and a transistor (Element Tr1), wherein a first output of the integrator is coupled to a non-

inverting input of the third operational amplifier, an inverting input of the third operational amplifier is coupled to an output of the recharging current detect unit (Column 8, lines 35-49), a first end of the fourth current detecting resistor is coupled to an output of the third operational amplifier and a second end of the fourth current detecting resistor is coupled to a first input of the transistor (Element 54), a second input of the transistor is coupled to a power source (element 51), and an output of the transistor is coupled to a positive terminal of the rechargeable battery (Element 3).

As to Claim 7, which is dependent upon claim 1, Matsuda discloses wherein the control unit includes a microprocessor (Figure 4, element 56).

As to Claim 8, Matsuda discloses a method for controlling recharging current of a rechargeable battery used in a digital device to recharge current of a rechargeable battery comprising: detecting a consuming current input to the digital device (Figure 1, element 11); detecting a battery recharging current as the battery is recharged (Element 10); generating a control signal based on said detected consuming current and said detected battery recharging current (Element 16); and regulating the recharging current to the rechargeable battery in proportion to the control signal and the detected battery recharging current (Elements 4 and 16)

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As to Claim 9, which is dependent upon claim 8, Matsuda discloses wherein the control signal is a pulse width modulation signal (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 10, which is dependent upon claim 8, Matsuda discloses adjusting the control signal according to the detected consuming current (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 12, which is dependent upon claim 10, Matsuda further discloses wherein the step of adjusting the control signal according to the detected consuming current comprises (Figure 1): determining whether the magnitude of the consuming current increases or decreases (element 13); and varying the control signal in accordance with the increase or decrease of the magnitude of the consuming current (element 16).

As to Claim 13, which is dependent upon claim 9, Matsuda the device further comprising: outputting a control signal according to a magnitude of the consuming current (element 16).

As to claim 35, which is dependent upon claim 12, Matsuda discloses wherein the control signal is a pulse width modulation signal and the step of varying the control signal comprises varying the duty cycle of the pulse width modulation signal (column 11, lines 18-20).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Hasegawa (US 5,545,969).

5. As to Claim 5, Matsuda discloses all the limitations of claim 1, but does not expressly disclose the limitations of the claim at hand. Hasegawa discloses the digital device capable of recharging a rechargeable battery according to claim 1, wherein the recharging current detect unit comprises (figure 1): a second current detecting resistor (element 2); a third current detecting resistor for detecting the rechargeable battery recharging current (resistor connected to – terminal of element 31); and a second operational amplifier (element 31), wherein a first end of the second current detecting resistor is coupled to a non-inverting input of the second operational amplifier and to the negative terminal of the rechargeable battery (3rd node off of the – terminal of battery 13 connecting down to element 31), and a first end of the third current detecting resistor is coupled to an inverting input of the third operational amplifier, and further wherein the second end of the second and third current detecting resistors are coupled together to

earth ground (Negative terminal of element 13). It would have been obvious to a person having ordinary skill in the art at the time of this invention to use the device of Hasewaga in order to measure the voltage being used to recharge the battery, in order to determine if the system is working as efficiently as it is capable.

6. ^{36, 38 are} Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Lefevre et al. (US 6,429,625).

A ^{36, 38 are} As to Claims 11, Matsuda discloses all the limitation of the independent claim 8, but does not expressly disclose displaying a recharge complete message. Lefevre discloses an electronic device which displaying a recharging complete message if the recharging current equals a predetermined value (Column 4, lines 66-67 and Column 5, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of this invention to include a recharge complete message in order to notify the user of the full charge status of the battery.

7. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Lee (US 5,900,717).

As to Claim 14, Matsuda discloses all the limitations of claim 13, Matsuda does disclose using a pulse width modulation duty cycle to control the charging of the battery. Matsuda does not expressly disclose a charging current routine. Lee

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discloses maintaining a first constant current for a first range of current values (Column 1, lines 65-67); maintaining a second constant current for a second range of consuming values (Column 1, lines 57-61); maintaining a third constant current for a third range of current values (Column 1, lines 61-65). The pulse width modulation of Matsuda would be used with the charging routine of Lee, and therefore moving from one current value to another would cause a linear adjustment in the duty cycle. It would have been obvious to one ordinary skill in the art at the time of this invention to combine the charging modes of Lee with the charger of Matsuda in order to rapidly and efficiently charge the battery.

As to Claim 15, which is dependent upon claim 14, Matsuda in view of Lee disclose the claimed invention except for wherein the first constant is in the range of about 50 to about 60 percent duty cycle. The examiner takes official notice that duty cycle times adjust the average value of the DC voltage output of a component, and the desired output value is reached through the adjustment of the duty cycle (Erickson Chapter 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the duty cycle according to the desired output current, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

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As to Claim 16, which is dependent upon claim 14, Matsuda in view of Lee disclose the claimed invention except for wherein the second constant is in the range of about 20 to about 30 percent duty cycle. The examiner takes official notice that duty cycle times adjust the average value of the DC voltage output of a component, and the desired output value is reached through the adjustment of the duty cycle (Erickson Chapter 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the duty cycle according to the desired output current, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 17, which is dependent upon claim 14, Lee discloses the claimed invention wherein the first range of consuming current values is in the range of at or about 0 milliamps to at or about 275 milliamps (Column 1, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the charging current to get the desired charge characteristic, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 18, which is dependent upon claim 14, Lee discloses the claimed invention wherein the second range of consuming current values is in the range of about 950

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milliamps to about 1200 milliamps (Column 1, lines 57-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the charging current to get the desired charge characteristic, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 19, which is dependent upon claim 14, Lee discloses the claimed invention wherein the third range of consuming current values is in the range of about 275 milliamps to about 950 milliamps (Column 1, lines 61-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the charging current to get the desired charge characteristic, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hutchison, IV et al. (US 6,118,250).

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As to Claim 20, Hutchison discloses a method for recharging a rechargeable battery in a digital device comprising: determining whether a voltage of a rechargeable battery is greater than a voltage, and if so, determining that the battery is partially discharged and performing a recharge operation according to the state of the digital device being used (Column 3, lines 6-12). Hutchison discloses the claimed invention except for the voltage being 5 volts. It would have been obvious to one having ordinary skill in the art at the time this invention was made to set the voltage at 5 volts, since it has been held that discovering an optimum value involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hutchison, IV et al. in view of Matsuda et al..

As to Claim 21, which is dependent upon claim 20, Hutchinson discloses all the limitation of the independent claim, but does not expressly disclose the limitations of claim 21. Matsuda discloses the step of performing a recharge operation according to a state of the digital device being used comprises; determining a consuming current (Figure 1, element 11); outputting a control signal according to the consuming current (element 16); and supplying a recharging current according to the control signal to the rechargeable battery for recharging (Column 16, lines 66-67, and column 17, lines 1-

7)(Being that there is only one power source, when Tr1 is switched on, it takes power that would have been supplied to the load).

As to Claim 22, which is dependent upon claim 21, Matsuda discloses wherein the control signal includes a pulse width modulation signal (Column 16, lines 66-67, and column 17, lines 1-7).

Allowable Subject Matter

10. Claims 23-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: Claim 23 recites, inter alia, supplying a portion of the consuming current to a rechargeable battery, determining whether the charging current is between 1000 and 300 milliamps, and determining if the recharging current reaches 300 milliamps within 12 hours, and if so, switch to a second recharge mode. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so.

12. The following is a statement of reasons for the indication of allowable subject matter: Claim 24 recites, inter alia, supplying a portion of the consuming current to a rechargeable battery at a charging current of less than or equal to 300 milliamps for substantially one hour, and illuminating an illumination device for substantially for one hour, and continuously after the first time period has expired. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so..

13. The following is a statement of reasons for the indication of allowable subject matter: Claim 25 recites, inter alia, supplying a portion of the consuming current to a rechargeable battery, determining whether the charging current does not reach 300 milliamps within 12 hours, and check to see if the battery voltage is greater than 7 volts. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so.

14. The following is a statement of reasons for the indication of allowable subject matter: Claim 27 recites, inter alia, determining if the battery voltage is less than or equal to 5 volts, charge the battery for approximately 2 seconds at about 80 milliamps, determine if the battery is now above 5 volts, and if so perform a quick charge, if not perform a trickle charge. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so.

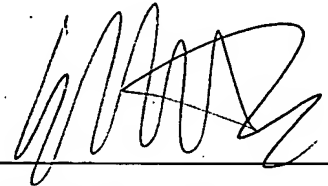
Conclusion

Any inquiry concerning this communication should be directed to the Examiner at the below-listed number on every Tuesday, Thursday and Saturday.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Karl Easthom, can be reached at (571) 272-1989 on Monday-Thursday.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist at (571) 272-2800, Monday-Friday, 8:30am to 5:00pm, EST.

By: _____

A handwritten signature in black ink, appearing to read 'EDWARD H TSO', written over a horizontal line.

EDWARD H TSO
Primary Examiner
(571) 272-2087